

had the results fall outside the acceptable ranges. In addition, I am required by the Commonwealth of Pennsylvania to perform quarterly low-volume proficiency tests on my machine using two levels of controls supplied by the state. In the 4 years that we have been participating in the state program, all of our results have been acceptable.

I suggest that perhaps part of the problem encountered in the Havas et al. study may be due to operator error. Operating the Reflotron and performing the screening correctly must be done according to strict protocol. Something as simple as cleaning the machine after use may not have been performed correctly, thus offering one possible reason for the results found in Massachusetts.

I have generally encountered no difficulties with the area physicians' acceptance of our results. I refer every person with a cholesterol 240 mg/dL or higher, or those with levels between 200 and 239 mg/dL who have two or more risk factors, to their physicians for a recheck, usually a lipid profile. In addition we offer diet counseling on the spot. Approximately 5 weeks after screening, we contact the residents to see if they have followed through with our recommendations. Among those residents who did see their physicians, the overwhelming response has been that, when the residents' doctors rechecked their cholesterol level, it was still high, often within several points of the results obtained on the Reflotron.

I think studies like this do a great disservice to the existing programs that are conducted with professional caution and attention to correct protocol. Perhaps other factors should have been considered as part of the whole picture. □

Judith M. Feil, RN, BSN

Requests for reprints should be sent to Judith M. Feil, RN, BSN, Project Concern Coordinator, Soldiers and Sailors Memorial Hospital, 32-36 Central Ave, Wellsboro, PA 16901-1899.

3. Havas Responds

Drs. van Beurden and James raise several concerns about my and my colleagues' study methodology. Unfortunately, their letter fails to distinguish appropriately between the two different but key components of test reliability: precision and accuracy. Precision reflects test-retest concordance. It is measured by calculating the coefficient of variation for repeat determinations of a sample by an analyzer. Our results showing less-than-optimal precision of the Reflotron are in

accord with those of numerous other investigators, as summarized in Table 2 of our paper. In fact, many of these studies showed the Reflotron producing results with higher coefficients of variation than ours.

Accuracy reflects how close the values that are determined by an analyzer are to the true values. Accuracy is assessed by comparing the mean of values determined by a new method with the mean obtained using a reference method. Once again, our results showing suboptimal accuracy of the Reflotron were consistent with those found in numerous other studies, as was also shown in Table 2. Many of these studies showed the Reflotron to have inaccuracy much greater than ours demonstrated.

Drs. van Beurden and James are correct in stating that it may not be totally fair to assume that all of the misclassification is due to the inaccuracy of the Reflotron. However, the standard method of presenting data on misclassification is by comparison with a reference method, because the reference method is the best available determination of the true value. Our reference laboratory had met the standardization requirements of the Centers for Disease Control Lipid Standardization Program, which gave us confidence in the reliability of the laboratory's results. Our results on the frequent misclassification caused by the Reflotron results are in accord with those reported elsewhere.

We did not present comparative data on other portable analyzers because this was not the purpose of our study. Drs. van Beurden and James are correct in noting that the full details of our study were not presented in this paper. Because we were requested to publish this manuscript as a Public Health Brief, our paper was limited in length. Additional details of the study can be found elsewhere.¹ A final point to be noted in regard to their letter is that, for both precision and accuracy, our study results were based on sample sizes of over 1000, whereas theirs were based on sample sizes as small as 30.² The large number of determinations, along with the consistency of our results with those of others, provide additional reasons for confidence in our findings.

Ms. Feil indicates in her letter that her quality control levels never fall outside the "acceptable" ranges. One can only wonder how broad these ranges are. Even if an analyzer demonstrates excellent precision and accuracy, a small percentage of samples should fall outside an acceptable range, presuming that that range has been

set with a coefficient of variation of no more than 5%. I should also point out that national standards recommend using three quality control levels, rather than two as her program is doing, and checking quality control levels at the beginning of the day and after every 10th sample, rather than once a day.

In regard to operator error as a possible reason for our results, our technicians were well trained. I again note that our results were very similar to those found by other investigators. The issue of machine malfunction may reflect either the length of time our analyzers were used in the field or our receiving, by chance, four machines of suboptimal quality.

Finally, Ms. Feil's point about the positive benefits from cholesterol screening programs is a good one. The many positive outcomes from our large screening program have been presented in detail elsewhere.³ Many individuals who are at high risk can be identified through such efforts and referred for follow-up to their physicians. People can be educated about dietary modification and can reduce their risks for both coronary and other diseases. However, to be most useful, screenings should be conducted with analyzers that provide reliable results. □

Stephen Havas, MD, MPH, MS

Requests for reprints should be sent to Stephen Havas, MD, MPH, MS, Department of Epidemiology and Preventive Medicine, University of Maryland-Baltimore, 660 W Redwood St, Room 145, Baltimore, MD 21201-1596.

References

1. Havas S, Bishop R, Koumjian L, Reisman J, Wozenski S. Performance of the Reflotron in a community-based screening program: results of the Massachusetts Model Systems for Blood Cholesterol Screening Project. *Am J Prev Med.* 1991;7:397-405.
2. James R, Tylker C, Henrikson D. An evaluation of the accuracy of the Reflotron system in the field. *Med J Aust.* 1988;149:130-131.
3. Havas S, Koumjian L, Reisman J, Hsu L, Wozenski S. Results of the Massachusetts Model Systems for Blood Cholesterol Screening Project. *JAMA.* 1991;266:375-381.

Can Smoking Be Child Abuse?

The 1986 Surgeon General's report on the health consequences of involuntary smoking concluded that involuntary smoking (passive smoking, environmental tobacco smoke) causes disease, including

lung cancer in nonsmoking healthy individuals.¹ Children of parents who smoke were found to have a higher frequency of respiratory infections, including bronchitis and pneumonia. Children exposed to environmental tobacco smoke were also found to have a reduction in pulmonary function, although not sufficient to cause symptoms. Chronic middle ear effusions were more common in children exposed to environmental tobacco smoke. Another study found that exposure to passive smoking during childhood and adolescence increases the risk of lung cancer.²

A 1989 Surgeon General's report showed that women who smoked during pregnancy had a higher frequency of intrauterine growth retardation and other complications.³ The birthweight of infants was lower for mothers who smoked while pregnant than for mothers who did not.³ Infants of nonsmoking mothers who lived with smokers were also found to have lower birthweight than infants of nonsmoking mothers not exposed to smokers.⁴

Child abuse is defined by the Child Abuse and Prevention Act of 1973 (Public Law 93-247, amended 1978 and 1984) as "the physical or mental injury, sexual

abuse, negligent treatment, or maltreatment of a child under the age of 18 years by a person responsible for the child's welfare under circumstances which indicate that the child's health or welfare is harmed or threatened thereby."

Is exposure to environmental tobacco smoke through a parent or caregiver a form of child abuse? Does the mother's smoking during pregnancy or the exposure of a nonsmoking pregnant woman to environmental tobacco smoke through a spouse who smokes constitute a form of child abuse?

Nonsmokers exposed to environmental tobacco smoke are unfairly endangered. Babies in utero, infants, and children are especially vulnerable because they cannot protect themselves. The individuals who are entrusted with their welfare are the sources of the threat to their health. Informing parents that they are abusing their children by exposing them to environmental tobacco smoke may provide parents with the motivation they need to quit smoking.

The nonsmoking spouses of smokers also have an increased risk of cancer and other illnesses.⁵ A corollary question then

is, does the exposure of a nonsmoking spouse to environmental tobacco smoke from a smoking spouse constitute a form of spouse abuse? □

Paul A. Fontelo, MD

Requests for reprints should be sent to Paul A. Fontelo, MD, Department of Pathology, Uniformed Services University, 4301 Jones Bridge Rd, Bethesda, MD 20814.

References

1. *The Health Consequences of Involuntary Smoking: A Report of the Surgeon General*. Washington, DC: US Dept of Health and Human Services; 1986. DHHS publication 87-8398.
2. Janerich DT, Thompson WD, Varela LR, et al. Lung cancer and exposure to tobacco smoke in the household. *N Engl J Med*. 1990;323:632-636.
3. *Reducing the Health Consequences of Smoking: 25 Years of Progress. A Report of the Surgeon General*. Washington, DC: US Dept of Health and Human Services; 1989. DHHS publication 89-8411.
4. Mathai M, Vijayasri R, Babu S, et al. Passive maternal smoking and birthweight in a South Indian population. *Br J Obstet Gynaecol*. 1992;99:342-343.
5. National Research Council. *Environmental Tobacco Smoke. Measuring Exposures and Assessing Health Effects*. Washington, DC: National Academy Press; 1986.